



Sequence Listing

RECEIVED
APR 16 2002
TECH CENTER 1600/2900

<110> Sidhu, Sachdev S.
Weiss, Gregory A.
Wells, James A.

<120> IMPROVEMENTS IN PHAGE DISPLAY

<130> P1581R2

<140> US 09/380,447

<141> 1999-09-01

<150> US 60/134,870

<151> 1999-05-19

<150> US 60/133,296

<151> 1999-05-10

<150> US 60/103,514

<151> 1998-10-08

<150> US 60/094,291

<151> 1998-07-27

<150> PCT/USUS99/16596

<151> 1999-07-22

<160> 287

<210> 1

<211> 50

<212> PRT

<213> Artificial sequence

<220>

<223> Synthetic coat protein

<220>

<221> unsure

<222> 12-30

<223> unknown amino acid

<400> 1

Met Ser Lys Ser Thr Phe Lys Lys Phe Leu Lys Xaa Xaa Xaa Xaa
1 5 10 15

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
20 25 30

Glu Thr Ala Ser Ala Gln Leu Ser Asn Phe Ala Ala Lys Ala Pro
35 40 45

Asp Asp Gly Glu Ala
50

<210> 2

<211> 50
<212> PRT
<213> M13 phage

<220>
<221> M13 phage
<222> 1-50
<223> coat protein VIII

<400> 2
Ala Glu Gly Asp Asp Pro Ala Lys Ala Ala Phe Asn Ser Leu Gln
1 5 10 15
Ala Ser Ala Thr Glu Tyr Ile Gly Tyr Ala Trp Ala Met Val Val
20 25 30
Val Ile Val Gly Ala Thr Ile Gly Ile Lys Leu Phe Lys Lys Phe
35 40 45
Thr Ser Lys Ala Ser
50

<210> 3
<211> 50
<212> PRT
<213> f1 phage

<220>
<221> f1 phage
<222> 1-50
<223> coat protein VIII

310
<400> 3
Ala Glu Gly Asp Asp Pro Ala Lys Ala Ala Phe Asp Ser Leu Gln
1 5 10 15
Ala Ser Ala Thr Glu Tyr Ile Gly Tyr Ala Trp Ala Met Val Val
20 25 30
Val Ile Val Gly Ala Thr Ile Gly Ile Lys Leu Phe Lys Lys Phe
35 40 45
Thr Ser Lys Ala Ser
50

<210> 4
<211> 50
<212> PRT
<213> fd phage

<220>
<221> fd phage
<222> 1-50
<223> coat protein VIII

<400> 4

Ala Glu Gly Asp Asp Pro Ala Lys Ala Ala Phe Asp Ser Leu Gln
1 5 10 15

Ala Ser Ala Thr Glu Tyr Ile Gly Tyr Ala Trp Ala Met Val Val
20 25 30

Val Ile Val Gly Ala Thr Ile Gly Ile Lys Leu Phe Lys Lys Phe
35 40 45

Thr Ser Lys Ala Ser
50

<210> 5

<211> 50

<212> PRT

<213> Zj-2 phage

<220>

<221> Zj-2 phage

<222> 1-50

<223> coat protein VIII

<400> 5

Ala Glu Gly Asp Asp Pro Ala Lys Ala Ala Phe Asp Ser Leu Gln
1 5 10 15

Ala Ser Ala Thr Glu Tyr Ile Gly Tyr Ala Trp Ala Met Val Val
20 25 30

Val Ile Val Gly Ala Thr Ile Gly Ile Lys Leu Phe Lys Lys Phe
35 40 45

Ala Ser Lys Ala Ser
50

<210> 6

<211> 50

<212> PRT

<213> Ifl phage

<220>

<221> Ifl phage

<222> 1-50

<223> coat protein VIII

<400> 6

Asp Asp Ala Thr Ser Gln Ala Lys Ala Ala Phe Asp Ser Leu Thr
1 5 10 15

Ala Gln Ala Thr Glu Met Ser Gly Tyr Ala Trp Ala Leu Val Val
20 25 30

Leu Val Val Gly Ala Thr Val Gly Ile Lys Leu Phe Lys Lys Phe
35 40 45

Val Ser Arg Ala Ser
50

<210> 7
<211> 50
<212> PRT
<213> I2-2 phage

<220>
<221> I2-2 phage
<222> 1-50
<223> coat protein VIII

<400> 7
Ser Thr Ala Thr Ser Tyr Ala Thr Glu Ala Met Asn Ser Leu Lys
1 5 10 15
Thr Gln Ala Thr Asp Leu Ile Asp Gln Thr Trp Pro Val Val Thr
20 25 30
Ser Val Ala Val Ala Gly Leu Ala Ile Arg Leu Phe Lys Lys Phe
35 40 45

Ser Ser Lys Ala Val
50

<210> 8
<211> 50
<212> PRT
<213> Ike phage

<220>
<221> Ike phage
<222> 1-50
<223> coat protein VIII

<400> 8
Asn Ala Ala Thr Asn Tyr Ala Thr Glu Ala Met Asp Ser Leu Lys
1 5 10 15
Thr Gln Ala Ile Asp Leu Ile Ser Gln Thr Trp Pro Val Val Thr
20 25 30
Thr Val Val Val Ala Gly Leu Val Ile Arg Leu Phe Lys Lys Phe
35 40 45

Ser Ser Lys Ala Val
50

<210> 9
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> oligonucleotide primer

<400> 9
aaaagaattc cgcacacccat cgaatggtgc 30

<210> 10
<211> 35
<212> DNA
<213> Artificial sequence

<220>
<223> oligonucleotide primer

<400> 10
accagatgca taagccgagg cggaaaacat catcg 35

<210> 11
<211> 56
<212> DNA
<213> Artificial sequence

<220>
<223> oligonucleotide primer

<400> 11
ttttctagac aggcctccca ccagatgcat aagccgaggc ggaaaacatc 50
atcgtc 56

B10
<210> 12
<211> 34
<212> DNA
<213> Artificial sequence

<220>
<223> oligonucleotide primer

<400> 12
gctatcgga tgcacgggc atcaccggca cctg 34

<210> 13
<211> 61
<212> DNA
<213> Artificial sequence

<220>
<223> oligonucleotide primer

<400> 13
gagtcacagt cgtcaggcgc ctctccgga tcctccaccc accttggtga 50
aggtgtcgtg g 61

<210> 14
<211> 18
<212> DNA
<213> Artificial sequence

<220>

<223> oligonucleotide primer

<400> 14
gggtatctag aggttgag 18

<210> 15
<211> 46
<212> DNA
<213> Artificial sequence

<220>
<223> oligonucleotide primer

<400> 15
tggagctccc ggatcctcca ccgctctgga agccacagct gccctc 46

<210> 16
<211> 42
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 16
ggatccggga gctccagctg atgaggtgac gatcccgcaa aa 42

<210> 17
<211> 42
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 17
gatcccgcaa aagcggcctg atgatccctg caagcctcag cg 42

<210> 18
<211> 42
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 18
caagcctcag cgaccgaatg atgaggttat gcgtgggcga tg 42

<210> 19
<211> 42
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 19
cgctggggcga tggttgtttg atgagtcggc gcaactatcg gt 42

<210> 20
<211> 42
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 20
gcaactatcg gatatcaagtg atgaaagaaa ttcacctcga aa 42

<210> 21
<211> 66
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<220>
<221> unsure
<222> 20, 22, 26, 28, 31, 34, 38, 41, 44, 47
<223> unknown base

B10
<400> 21
ggatccggga gctccagcrn tnasrntnas nasnycrntr narnttrnttt 50
taactccctg caagcc 66

<210> 22
<211> 66
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<220>
<221> unsure
<222> 19, 22, 26, 28, 31, 35, 38, 41, 44, 46
<223> unknown base

<400> 22
gatcccgcaa aagcggccnw tnasrntnyt nasrntnrtr ntrntnasta 50
tatcggttat gcgtgg 66

<210> 23
<211> 70
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<220>
<221> unsure
<222> 19, 22, 25, 28, 31, 35, 38, 41, 44, 47
<223> unknown base

<400> 23
caagcctcag cgaccgaanw cnwcnktnwc nyynknknyt nkgnwtntwtg 50
tcattgtcgg cgcaactatc 70

<210> 24
<211> 66
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<220>
<221> unsure
<222> 19, 22, 25, 28, 31, 34, 37-38, 40-41, 43-44
<223> unknown base

<400> 24
gcgtgggcca tgggtgttnw tnwcnwtntk nytnytnntn ntnntaagct 50
gtttaagaaa ttcacc 66

B10
<210> 25
<211> 72
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<220>
<221> unsure
<222> 19-20, 22-23, 31-32, 34-35, 37-38, 43-44, 46-47
<223> unknown base

<400> 25
gcaactatcg gatatcaagn gnnsaagaaa nnsnngnnga aanngnngtg 50
ataaaccgat acaattaaag gc 72

<210> 26
<211> 66
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 26
gatcccgcaa aagcggccta tgaggctctt gaggatattg ctactaacta 50

tatcggttat gcgtgg 66

<210> 27

<211> 36

<212> DNA

<213> Artificial sequence

<220>

<223> mutagenic oligonucleotide

<400> 27

ccgacaccct ccaatgctga ggaaacacaa cagaaa 36

<210> 28

<211> 36

<212> DNA

<213> Artificial sequence

<220>

<223> mutagenic oligonucleotide

<400> 28

ttcaggaagg acatggctaa ggtcgagaca ttcttg 36

<210> 29

<211> 75

<212> DNA

<213> Artificial sequence

<220>

<223> mutagenic oligonucleotide

<400> 29

aactacgggc tgctcgcttg cttcaggaag gacatggaca aggtcgagac 50

attcctggct atcgtgcagt gccgc 75

<210> 30

<211> 57

<212> DNA

<213> Artificial sequence

<220>

<223> mutagenic oligonucleotide

<400> 30

ttcaggaagg acatggacgc tgctcgagaca ttctggcta tcgtccagt 50

ccgctct 57

<210> 31

<211> 42

<212> DNA

<213> Artificial sequence

<220>

<223> mutagenic oligonucleotide

<400> 31
ggtggaggat ccgggagctg atgagccgag ggtgacgatc cc 42

<210> 32
<211> 46
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 32
caccaagggtg gtctagagct aataataagc cgagggtgac gatccc 46

<210> 33
<211> 50
<212> PRT
<213> Artificial sequence

<220>
<223> P12-1 variant

<400> 33
Met Ser Lys Ser Thr Phe Lys Lys Phe Leu Lys Val Phe Val Phe
1 5 10 15

Ser Val Asp Val Asp Asn Asn Trp Ile Trp Ala Val Gly Ile Ile
20 25 30

Tyr Met Leu Leu Val Glu Ala Ser Pro Trp Ala Ala Lys Ala Pro
35 40 45

Asp Asp Gly Glu Ala
50

<210> 34
<211> 93
<212> DNA
<213> Artificial sequence

<220>
<223> oligonucleotide linker library

<400> 34
gagggcagct gtggcttcgg tggcggtvvc vvcvvcvvcv vcvvcvvcv 50
cvvcvvcvvc vvcvvcvvcg gcggtgccga gggtagcat ccc 93

<210> 35
<211> 51
<212> DNA
<213> Artificial sequence

<220>
<223> oligonucleotide linker library

<400> 35

caccaagggtg gtctagagvv cvvcvvcvvc vvcgccgagg gtgacgatcc 50

c 51

<210> 36

<211> 67

<212> DNA

<213> Artificial sequence

<220>

<221> Artificial sequence

<222> 1-67

<223> oligonucleotide linker library

<400> 36

caccaagggtg gtctagagcv vcvcvvcvvc cvvcvvcvvc vvcvvcvvcg 50

ccgagggtga cgatccc 67

<210> 37

<211> 82

<212> DNA

<213> Artificial sequence

<220>

<223> oligonucleotide linker library

<400> 37

caccaagggtg gtctagagcv vcvcvvcvvc cvvcvvcvvc vvcvvcvvcv 50

vcvcvvcvvc cvvcgccgag ggtgacgatc cc 82

<210> 38

<211> 97

<212> DNA

<213> Artificial sequence

<220>

<223> oligonucleotide linker library

<400> 38

caccaagggtg gtctagagcv vcvcvvcvvc cvvcvvcvvc vvcvvcvvcv 50

vcvcvvcvvc cvvcvvcvvc vvcvvcvvcg ccgagggtga cgatccc 97

<210> 39

<211> 112

<212> DNA

<213> Artificial sequence

<220>

<223> oligonucleotide linker library

<400> 39

caccaagggtg gtctagagcv vcvcvvcvvc cvvcvvcvvc vvcvvcvvcv 50

vcvcvvcvvc cvvcvvcvvc vvcvvcvvcv vcvcvvcvvc cvvcgccgag 100

ggtgacgata cc 112

<210> 40
<211> 66
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 40
aagttcgcta gagatgctta tgaggctctt gaggatattg ctactaacta 50
tatcggttat gcgtgg 66

<210> 41
<211> 66
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 41
gaggatattg ctactaacct tttctttctc cttgggactg tgcattcttgt 50
cattgtcggc gcaact 66

B10
<210> 42
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 42
gcaaaagcgg cctataacgc tcttgaggat att 33

<210> 43
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 43
tatgaggctc ttgaggccat tgctactaac tat 33

<210> 44
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 44
gaggctcttg aggattcage tactaactat atc 33

<210> 45
<211> 66
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 45
gatcccgcaa aagcggccta tgaggctctt gaggatattg ctactaacta 50
tatcggttat gcgtgg 66

<210> 46
<211> 66
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 46
gagggcagct gtggcttcca gagcgggtgga ggatccggga gctccagcgc 50
cgagggtgac gatccc 66

<210> 47
<211> 60
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 47
cccgcaaaag cggcctttaa cgctctgcaa gccattgcga ccgaatatat 50
cggttatgcg 60

<210> 48
<211> 66
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 48
caagcctcag cgaccgaact tttctttctc cttgggactg tgcattctgt 50
cattgtcggc gcaact 66

<210> 49
<211> 33

<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 49
tccgggagct ccagcgccaa gaggagaag ttc 33

<210> 50
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 50
gggagctcca gcgatgagag tgagaagttc gct 33

<210> 51
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 51
agctccagcg ataagggtga gaagttcgct aga 33

<210> 52
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 52
tccagcgata agagtgacaa gttcgctaga gat 33

<210> 53
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 53
agcgataaga gtgaggattt cgctagagat gct 33

<210> 54
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 54
gataagagtg agaagccgc tagagatgct ttt 33

<210> 55
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 55
agtgagaagt tcgctaaaga tgcttttaac tcc 33

<210> 56
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<221> Artificial sequence
<222> 1-33
<223> mutagenic oligonucleotide

<400> 56
gagaagttcg ctagagcggc ttttaactcc ctg 33

<210> 57
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 57
cccgcaaaag cggcctttga ggctcttgag gat 33

<210> 58
<211> 34
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 58
gcaaaagcgg cctataaacg ctcttgagga tatt 34

<210> 59
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 59
aaagcggcct atgagtcct tgaggatatt gct 33

<210> 60
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 60
gcctatgagg ctcttcaaga tattgctact aac 33

<210> 61
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 61
tatgaggctc ttgaggccat tgctactaac tat 33

<210> 62
<211> 33
<212> DNA
<213> Artificial sequence

B10
<220>
<223> mutagenic oligonucleotide

<400> 62
gaggctcttg aggattcagc tactaactat atc 33

<210> 63
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 63
gaggatattg ctactgaata tatcggttat gcg 33

<210> 64
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 64
gcctcagcga ccgaatatctt ctttctcctt ggg 33

<210> 65
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 65
tcagcgaccg aacttatctt tctccttggg act 33

<210> 66
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 66
gcgaccgaac ttttcggtct ccttgggact gtg 33

<210> 67
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 67
accgaacttt tcttttatct tgggactgtg cat 33

<210> 68
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 68
gaacttttct ttctcgagg gactgtgcat ctt 33

<210> 69
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 69
cttttctttc tcctttggac tgtgcatctt gtc 33

<210> 70
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 70
ttctttctcc ttggggcggt gcatcttgtc att 33

<210> 71
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 71
tttctccttg ggactatgca tcttgtcatt gtc 33

<210> 72
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

310
<400> 72
ctccttgga ctgtggttct tgtcattgtc ggc 33

<210> 73
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 73
cttgggactg tgcattgttgc cattgtcggc gca 33

<210> 74
<211> 36
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 74
gcaaaagcgg cctataactc ccttgaggat attgct 36

<210> 75
<211> 48

<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 75
gcaaaagcgg cctataacgc tcttgaggat tcagctacta actatatc 48

<210> 76
<211> 60
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 76
cccgc aaaag cggcctatga gtcccttgag gattcagcta ctaactatat 50

cggttatgcg 60

<210> 77
<211> 48
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 77
gcaaaagcgg cctataactc ccttgaggat tcagctacta actatatc 48

<210> 78
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> peptide linker

<400> 78
Gln Ser Gly Gly Gly Ser Gly Ser Ser Ser
1 5 10

<210> 79
<211> 5
<212> PRT
<213> Artificial sequence

<220>
<223> penta peptide

<400> 79
Gly Gly Arg Pro Val
1 5

<210> 80
<211> 34
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 80
cagagcgggtg gaggatccgg gagctccaga ggggt 34

<210> 81
<211> 39
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 81
cagagcgggtg gaggatccgg gagctccagc gccgagggt 39

<210> 82
<211> 12
<212> PRT
<213> Artificial sequence

<220>
<223> peptide flag

<400> 82
Met Ala Asp Pro Asn Arg Phe Arg Gly Lys Asp Leu
1 5 10

<210> 83
<211> 60
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 83
gatggtgaag ctgcgggtga tgcattctggt agcgtctaga gccaccatca 50
ccatcaccat 60

<210> 84
<211> 60
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 84
gctgtcggta ttatttacat gctcctcgtg gaggcgtcgc cctgggctgc 50

taaggcgcca 60

<210> 85
<211> 33
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 85
acctcgaaag caagccatca ccatcacat gcg 33

<210> 86
<211> 36
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 86
acctcgaaag caagcgcca tcaccatcac catgcg 36

<210> 87
<211> 39
<212> DNA
<213> Artificial sequence

310 <220>
<223> mutagenic oligonucleotide

<400> 87
acctcgaaag caagcggtgg ccatcacat caccatgcg 39

<210> 88
<211> 42
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 88
acctcgaaag caagcggtgg tggccatcac catcacatg cg 42

<210> 89
<211> 45
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 89
acctcgaaag caagcggcgg tggcggccat caccatcacc atgcg 45

<210> 90
<211> 51
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 90
acctcgaaag caagcgggtgg tggcgggtggt ggccatcacc atcaccatgc 50
g 51

<210> 91
<211> 54
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 91
acctcgaaag caagcggcgg tgggtggcggg ggtggccatc accatcacca 50
tgcg 54

<210> 92
<211> 57
<212> DNA
<213> Artificial sequence

310
<220>
<223> mutagenic oligonucleotide
<400> 92
acctcgaaag caagcgggtgg cgggtgggtggc ggtgggtggcc atcaccatca 50
ccatgcg 57

<210> 93
<211> 60
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 93
acctcgaaag caagcggcgg tggcgggtggt ggcgggtggtg gccatcacca 50
tcaccatgcg 60

<210> 94
<211> 63
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 94
acctcgaaag caagcgggtgg cgggtggcggt ggtggcggtg gtggccatca 50
ccatcaccat gcg 63

<210> 95
<211> 69
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 95
acctcgaaag caagcgggtgg cgggtggcggt ggcggtggtg gcggtggtgg 50
ccatcaccat caccatgcg 69

<210> 96
<211> 75
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

B10
<400> 96
acctcgaaag caagcgggtgg tgggtggcggt ggcggtggcg gtggtggcgg 50
tgggtggccat caccatcacc atgcg 75

<210> 97
<211> 81
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 97
acctcgaaag caagcggcgg cgggtggtggt ggcggtggcg gtggcggtgg 50
tggcggtggt ggccatcacc atcaccatgc g 81

<210> 98
<211> 87
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 98
acctcgaaag caagcggcgg tggcggcggt ggtggtggcg gtggcggtgg 50

cggtggtggc ggtggtggcc atcaccatca ccatgcg 87

<210> 99
<211> 93
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 99
acctcgaaag caagcgggtg tggcgggtggc ggcgggtggtg gtggcgggtg 50

cggtggcgggt ggtggcgggtg gtggccatca ccatcaccat gcg 93

<210> 100
<211> 60
<212> DNA
<213> Artificial sequence

<220>
<223> zone library

<220>
<221> unsure
<222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35
<223> unknown base

B10
<400> 100
caaggaccat agattatgnn snnsnnsnns nnsnnsaagt ttctgaaagt 50
ttttgttttt 60

<210> 101
<211> 57
<212> DNA
<213> Artificial sequence

<220>
<223> zone library

<220>
<221> unsure
<222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35
<223> unknown base

<400> 101
attatgagca agagcactnn snnsnnsnns nnsnnsgttt ttgttttttc 50
tgttgat 57

<210> 102
<211> 69
<212> DNA
<213> Artificial sequence

<220>

<223> zone library
 <220>
 <221> unsure
 <222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35, 37-38, 40-41, 43-44,
 46-47
 <223> unknown base
 <400> 102
 ttcaaaaagt ttctgaaann snnsnnsnns nnsnnsnnsn nsnnsnnsaa 50
 ttggatttggt gctgtcggt 69
 <210> 103
 <211> 69
 <212> DNA
 <213> Artificial sequence
 <220>
 <223> zone library
 <220>
 <221> unsure
 <222> 22-23, 25-26, 28-29, 31-32, 34-35, 37-38, 40-41, 43-44, 46-47,
 49-50
 <223> unknown base
 <400> 103
 gttttttctg ttgatgttga tnnsnnsnns nnsnnsnnsn nsnnsnnsnn 50
 sgcggtgat gcattccca 69
 <210> 104
 <211> 72
 <212> DNA
 <213> Artificial sequence
 <220>
 <223> zone library
 <220>
 <221> unsure
 <222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35, 37-38, 40-41, 43-44,
 46-47
 <223> unknown base
 <400> 104
 tgggtgtcgt gtattattnn snnsnnsnns nnsnnsnnsn nsnnsnnsngc 50
 tgctaaggcg ccagacgatg gt 72
 <210> 105
 <211> 69
 <212> DNA
 <213> Artificial sequence
 <220>

<223> zone library

<220>

<221> unsure

<222> 22-23, 25-26, 28-29, 31-32, 34-35, 37-38, 40-41, 43-44, 46-47, 49-50

<223> unknown base

<400> 105

agcgctcagc tgagcaactt cnnsnnsnns nnsnnsnnsn nsnsnnsnn 50

sgcggtgat gcattccca 69

<210> 106

<211> 81

<212> DNA

<213> Artificial sequence

<220>

<223> linker library

<400> 106

gatggtgaag ctgcggtctv cvvcvvcvvc vvcvvcvvcv vcvcvvcvvcv 50

cvvcvvcvvc gatgcattcc caactatacc a 81

<210> 107

<211> 96

<212> DNA

<213> Artificial sequence

<220>

<223> mutagenic oligonucleotide

<220>

<221> unsure

<222> 22, 25, 28, 31, 34, 37, 40, 43, 46, 49, 52, 55, 58, 61, 64, 67, 70, 73, 76

<223> unknown base

<400> 107

actttcaaaa agtttctgaa anwtknktnwt nytnytnktn wtnwtntwnw 50

tnwtknknyt nkgnytnwcn ktnwtntwtga gactgctagc gctcag 96

<210> 108

<211> 21

<212> DNA

<213> Artificial sequence

<220>

<223> synthetic oligonucleotide

<400> 108

caccatcacc atcaccatgc g 21

<210> 109

<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 109
gcctgggagg agaacatcga cagcgccccc 30

<210> 110
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 110
Ala Trp Glu Glu Asn Ile Asp Ser Ala Pro
1 5 10

<210> 111
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 111
cagtacggga cgccggacac cgacaccgac 30

<210> 112
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 112
Gln Tyr Gly Thr Pro Asp Thr Asp Thr Asp
1 5 10

<210> 113
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 113
acggggtggt tggaggggcc cgacaccccc 30

<210> 114

<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 114
Thr Gly Trp Leu Glu Gly Pro Asp Thr Pro
1 5 10

<210> 115
<211> 24
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 115
ctcatggggcc ccggcgcgga cggc 24

<210> 116
<211> 8
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 116
Leu Met Gly Pro Gly Ala Asp Gly
1 5

<210> 117
<211> 24
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 117
cacgactcgg tcccagagcaa cggc 24

<210> 118
<211> 8
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 118
His Asp Ser Val Pro Ser Asn Gly
1 5

<210> 119
<211> 120
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 119
atgagcaaga gcactttcaa aaagtttctg aaagagactg ctagcgctca 50
gctgagcaac ttcgctgcta aggcgccaga cgatggtgaa gctgcggctc 100
accatcacca tcaccatgcg 120

<210> 120
<211> 40
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 120
Met Ser Lys Ser Thr Phe Lys Lys Phe Leu Lys Glu Thr Ala Ser
1 5 10 15
Ala Gln Leu Ser Asn Phe Ala Ala Lys Ala Pro Asp Asp Gly Glu
20 25 30
Ala Ala Ala His His His His His His Ala
35 40

<210> 121
<211> 41
<212> PRT
<213> Artificial sequence

<220>
<223> M13 coat protein VIII library

<220>
<221> unsure
<222> 12
<223> unknown amino acid

<400> 121
Met Ser Lys Ser Thr Phe Lys Lys Phe Leu Lys Xaa Glu Thr Ala
1 5 10 15
Ser Ala Gln Leu Ser Asn Phe Ala Ala Lys Ala Pro Asp Asp Gly
20 25 30
Glu Ala Ala Ala His His His His His His Ala
35 40

<210> 122

<211> 51
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide

<400> 122
gctgcggtg atgcatctgg tagcgtctag agccaccatc accatcacca 50
t 51

<210> 123
<211> 54
<212> PRT
<213> Artificial sequence

<220>
<223> P1-1 plus linker

<400> 123
Met Ser Lys Ser Thr Phe Lys Lys Phe Leu Lys Val Phe Val Phe
1 5 10 15
Ser Val Asp Val Asp Asn Asn Trp Ile Trp Ala Val Gly Ile Ile
20 25 30
Glu Thr Ala Ser Ala Gln Leu Ser Asn Phe Ala Ala Lys Ala Pro
35 40 45
Asp Asp Gly Glu Ala Ala Ala Asp Ala
50

<210> 124
<211> 150
<212> DNA
<213> Artificial sequence

<220>
<223> M13 coat protein VIII variant

<400> 124
atgagcaaga gcactttcaa aaagtttctg aaagtttttg ttttttctgt 50
tgatgttgat aataattgga tttgggctgt cggtattatt tacatgctcc 100
tcgtggaggc gtcgccttgg gctgctaagg cgccagacga tggatgaagct 150

<210> 125
<211> 48
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide library

<220>

<221> unsure
<222> 19-20, 22-23, 25-26, 28-29
<223> unknown base

<400> 125
ttcacctcga aagcaagcnn snnsnnsnns caccatcacc atcaccat 48

<210> 126
<211> 51
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide library

<220>
<221> unsure
<222> 19-20, 22-23, 25-26, 28-29, 31-32
<223> unknown base

<400> 126
ttcacctcga aagcaagcnn snnsnnsnns nnsccaccatc accatcacca 50

t 51

<210> 127
<211> 54
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide library

<220>
<221> unsure
<222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35
<223> unknown base

<400> 127
ttcacctcga aagcaagcnn snnsnnsnns nnsnnsccacc atcaccatca 50

ccat 54

<210> 128
<211> 60
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide library

<220>
<221> unsure
<222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35
<223> unknown base

<400> 128

ttcacctcga aagcaagcnn snnsnnsnns nnsnnsvvcv vccaccatca 50

ccatcaccat 60

<210> 129

<211> 66

<212> DNA

<213> Artificial sequence

<220>

<223> mutagenic oligonucleotide library

<220>

<221> unsure

<222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35

<223> unknown base

<400> 129

ttcacctcga aagcaagcnn snnsnnsnns nnsnnsvvcv vcvvcvvcca 50

ccatcaccat caccat 66

<210> 130

<211> 75

<212> DNA

<213> Artificial sequence

<220>

<223> mutagenic oligonucleotide library

<220>

<221> unsure

<222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35

<223> unknown base

<400> 130

ctgcgtaata aggagtctnn snnsnnsnns nnsnnsccacc atcaccatca 50

ccattaatca tgccagttct tttgg 75

<210> 131

<211> 81

<212> DNA

<213> Artificial sequence

<220>

<223> mutagenic oligonucleotide library

<220>

<221> unsure

<222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35, 37-38, 40-41

<223> unknown base

<400> 131

ctgcgtaata aggagtctnn snnsnnsnns nnsnnsnnsn nscaccatca 50

ccatcaccat taatcatgcc agttcttttg g 81

<210> 132
<211> 87
<212> DNA
<213> Artificial sequence

<220>
<223> mutagenic oligonucleotide library

<220>
<221> unsure
<222> 19-20, 22-23, 25-26, 28-29, 31-32, 34-35, 37-38, 40-41, 43-44,
46-47
<223> unknown base

<400> 132
ctgcgtaata aggagtctnn snnsnnsnns nnsnnsnnsn nsnsnnsca 50

ccatcaccat caccattaat catgccagtt cttttgg 87

<210> 133
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 133
gggcaggcca ggatcgtcta ccggcagaag 30

<210> 134
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> peptide linker

<400> 134
Gly Gln Ala Arg Ile Val Tyr Arg Gln Lys
1 5 10

<210> 135
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 135
aggatcaggg tctgcagaa gggcaaggag 30

<210> 136
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> peptide linker

<400> 136
Arg Ile Arg Val Leu Gln Lys Gly Lys Glu
1 5 10

<210> 137
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 137
cgcgccaaga tcgagcagat ctgcaaggag 30

<210> 138
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> peptide linker

<400> 138
Arg Ala Lys Ile Glu Gln Ile Cys Lys Glu
1 5 10

<210> 139
<211> 27
<212> DNA
<213> Artificial sequence

<220>
<223> M13 coat protein VIII fragment oligonucleotide library

<220>
<221> unsure
<222> 2, 4, 8, 10, 13, 17, 20, 23, 26
<223> unknown base

<400> 139
rntnasrntn asnycrntn arntrnt 27

<210> 140
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 wt coat protein VIII fragment oligonucleotide

<400> 140
gccgagggtg acgatcccgc aaaagcggcc 30

<210> 141
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 wt coat protein VIII fragment

<400> 141
Ala Glu Gly Asp Asp Pro Ala Lys Ala Ala
1 5 10

<210> 142
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 142
gataagagtg agaagttcgc tagagatgct 30

<210> 143
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 143
Asp Lys Ser Glu Lys Phe Ala Arg Asp Ala
1 5 10

<210> 144
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 144
aataaggatg agcagttcgc tagagctgct 30

<210> 145
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 145
Ile Lys Asp Glu Gly Phe Ala Arg Ala Ala
1 5 10

<210> 146
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 146
atttacatta aggagaccag taaaaatgct 30

<210> 147
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 147
Ile Tyr Ile Lys Glu Thr Ser Lys Asn Ala
1 5 10

<210> 148
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 148
aattacgttg accaggtcag taaaaatgct 30

<210> 149
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 149
Asn Tyr Val Asp Gln Val Ser Lys Asn Ala
1 5 10

<210> 150
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 150
gctaaggctg aggagttcgc tgaagctgct 30

<210> 151
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 151
Ala Lys Ala Glu Glu Phe Ala Glu Ala Ala
1 5 10

<210> 152
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 152
gctgacattg acgacttcgc tagaagtgct 30

<210> 153
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 153
Ala Asp Ile Asp Asp Phe Ala Arg Ser Ala
1 5 10

<210> 154
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 coat protein VIII fragment oligonucleotide library

<220>
<221> unsure
<222> 1, 4, 8, 10, 13, 17, 20, 23, 26, 28
<223> unknown base

<400> 154
nwt nasrntn ytnasrntn trntrntnas 30

<210> 155
<211> 30
<212> DNA
<213> Artificial sequence

<220>

<223> M13 wt coat protein VIII fragment oligonucleotide

<400> 155

tttaactccc tgcaagcctc agcgaccgaa 30

<210> 156

<211> 10

<212> PRT

<213> Artificial sequence

<220>

<223> M13 wt coat protein VIII fragment

<400> 156

Phe Asn Ser Leu Gln Ala Ser Ala Thr Glu
1 5 10

<210> 157

<211> 30

<212> DNA

<213> Artificial sequence

<220>

<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 157

tatgaggctc ttgaggatat tgctactaac 30

<210> 158

<211> 10

<212> PRT

<213> Artificial sequence

<220>

<223> M13 variant coat protein VIII fragment

<400> 158

Tyr Glu Ala Leu Glu Asp Ile Ala Thr Asn
1 5 10

<210> 159

<211> 30

<212> DNA

<213> Artificial sequence

<220>

<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 159

tatgaggctc ttgaggatat tgctactaac 30

<210> 160

<211> 10

<212> PRT

<213> Artificial sequence

<220>

<223> M13 variant coat protein VIII fragment

<400> 160

Tyr Glu Ala Leu Glu Asp Ile Ala Thr Asn
1 5 10

<210> 161

<211> 30

<212> DNA

<213> Artificial sequence

<220>

<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 161

tatgaggctc ttgaggatat tgctactaac 30

<210> 162

<211> 10

<212> PRT

<213> Artificial sequence

<220>

<223> M13 variant coat protein VIII fragment

<400> 162

Tyr Glu Ala Leu Glu Asp Ile Ala Thr Asn
1 5 10

<210> 163

<211> 30

<212> DNA

<213> Artificial sequence

<220>

<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 163

tatgacgttc ttcagattgc tgctattaac 30

<210> 164

<211> 10

<212> PRT

<213> Artificial sequence

<220>

<223> M13 variant coat protein VIII fragment

<400> 164

Tyr Asp Val Leu Gln Ile Ala Ala Ile Asn
1 5 10

<210> 165

<211> 30

<212> DNA

<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 165
cttaaggatc ttaaggctac tggtattcag 30

<210> 166
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 166
Leu Lys Asp Leu Lys Ala Thr Val Ile Gln
1 5 10

<210> 167
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 167
tatgagacta ttaaggatga tattgttaag 30

310
<210> 168
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 168
Tyr Glu Thr Ile Lys Asp Asp Ile Val Lys
1 5 10

<210> 169
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 169
cttcagaata ttcacagtag tattagtaag 30

<210> 170
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 170
Leu Gln Asn Ile His Ser Ser Ile Ser Lys
1 5 10

<210> 171
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 171
tataagactg ttcagggcgc tattgctaag 30

<210> 172
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 172
Tyr Lys Thr Val Gln Gly Ala Ile Ala Lys
1 5 10

<210> 173
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 173
tataagacta ttaagagtat tgctaataag 30

<210> 174
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 174
Tyr Lys Thr Ile Lys Ser Ile Ala Asn Lys
1 5 10

<210> 175
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 175
tattagagtc ttcagattat tgctgctcag 30

<210> 176
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 176
Tyr Gln Ser Leu Gln Ile Ile Ala Ala Gln
1 5 10

<210> 177
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 177
tttcagagtc ttaaggatac tgctgatgag 30

<210> 178
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 178
Phe Gln Ser Leu Lys Asp Thr Ala Asp Glu
1 5 10

<210> 179
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 179
tttgagaatc tttaggctac tattactaag 30

<210> 180
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 180
Phe Glu Asn Leu Gln Ala Thr Ile Thr Lys
1 5 10

<210> 181
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 coat protein VIII fragment oligonucleotide library

<220>
<221> unsure
<222> 1, 4, 7, 10, 13, 16, 19, 22, 25, 28
<223> unknown base

<400> 181
nwnwnknkn wcnynknkny tnknwnwnwt 30

<210> 182
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 wt coat protein VIII fragment oligonucleotide

<400> 182
tatatcggtt atcgctgggc gatggttggt 30

<210> 183
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 wt coat protein VIII fragment

<400> 183
Tyr Ile Gly Tyr Ala Trp Ala Met Val Val
1 5 10

<210> 184
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 184
cttttctttc tccttgggac tgtgcatctt 30

<210> 185
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 185
Leu Phe Phe Leu Leu Gly Thr Val His Leu
1 5 10

<210> 186
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 186
tactacctta acattttggc tgtgtatggt 30

<210> 187
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 187
Tyr Tyr Leu Asn Ile Leu Ala Val Tyr Val
1 5 10

<210> 188
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 188
ttcatccgtg tcacttggac tatgtatggt 30

<210> 189
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 189
Phe Ile Arg Val Thr Trp Thr Met Tyr Val
1 5 10

<210> 190
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 190
gtcatccggtt acgttatgtc tatgtatggt 30

<210> 191
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 191
Val Ile Arg Tyr Val Met Ser Met Tyr Val
1 5 10

<210> 192
<211> 42
<212> DNA
<213> Artificial sequence

B10
<220>
<223> linker oligonucleotide
<400> 192
gacggcagca acagcaccca cccccaccgc cacaaccgcc gc 42

<210> 193
<211> 14
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 193
Asp Gly Ser Asn Ser Thr His Pro His Arg His Asn Arg Arg
1 5 10

<210> 194
<211> 42
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 194
accgcccgcc acgccaacga caacgacggc gcccaccgcc cc 42

<210> 195
<211> 14
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 195
Thr Ala Arg His Ala Asn Asp Asn Asp Gly Ala His Arg Pro
1 5 10

<210> 196
<211> 42
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 196
accacaccca acccccgcaa cgccgccggc cccgcccccg gc 42

<210> 197
<211> 14
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 197
Thr His Pro Asn Pro Arg Asn Ala Ala Gly Pro Ala Pro Gly
1 5 10

<210> 198
<211> 42
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 198
caccgcaacg gcaccgaccc cggcggcccc cgcgccccgcc ac 42

<210> 199
<211> 14
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 199
His Arg Asn Gly Thr Asp Pro Gly Gly Pro Arg Ala Arg His
1 5 10

<210> 200
<211> 42
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 200
gccccccgcg acaccaccgc ccaccgccac acccaccgcc ac 42

<210> 201
<211> 14
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 201
Ala Pro Arg Asp Thr Thr Ala His Arg His Thr His Arg His
1 5 10

<210> 202
<211> 42
<212> DNA
<213> Artificial sequence

B10
<220>
<223> linker oligonucleotide

<400> 202
ccccgcagcg cccgcagccg caacaccaac gaccgccacg ac 42

<210> 203
<211> 14
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 203
Pro Arg Ser Ala Arg Ser Arg Asn Thr Asn Asp Arg His Asp
1 5 10

<210> 204
<211> 42
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 204
accgccccct accgcagcag caactacgcc cagccccca cc 42

<210> 205
<211> 14
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 205
Thr Ala Pro Asp Arg Ser Ser Asn Asp Ala His Ala Pro Thr
1 5 10

<210> 206
<211> 42
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 206
ggcagcccca gcaaccccg cgcccgacc cgcgccggca cc 42

<210> 207
<211> 14
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 207
Gly Ser Pro Ser Asn Pro Gly Ala Arg Thr Arg Ala Gly Thr
1 5 10

<210> 208
<211> 42
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 208
ggccacgccg gccaccccca ccgccccgc caccgcgcc gc 42

<210> 209
<211> 14
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 209
Gly His Ala Gly His Pro His Arg Pro Arg His Pro Ala Arg
1 5 10

<210> 210
<211> 15
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 210
gcccgcgcca accgc 15

<210> 211
<211> 5
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 211
Ala Arg Ala Asn Arg
1 5

<210> 212
<211> 15
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 212
cgccacaacc gccgc 15

<210> 213
<211> 5
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 213
Arg His Asn Arg Arg
1 5

<210> 214
<211> 15
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 214
gaccacagca gcgcc 15

<210> 215
<211> 5
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 215
Asp His Ser Ser Ala
1 5

<210> 216
<211> 15
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 216
gccccgcgcc ccacc 15

<210> 217
<211> 5
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 217
Ala Arg Gly Pro Thr
1 5

<210> 218
<211> 15
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 218
cacacccccg gcgcc 15

<210> 219
<211> 5
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 219
His Thr Pro Gly Ala
1 5

<210> 220
<211> 15
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 220
aacagcggcg gcgac 15

<210> 221
<211> 5
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 221
Asn Ser Gly Gly Asp
1 5

<210> 222
<211> 15
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 222
cgaccacca gcaac 15

<210> 223
<211> 5
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 223
Arg Thr Thr Ser Asn
1 5

<210> 224
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 224
gcccgcgcc gcaccgcca ccacgaccgc 30

<210> 225
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 225
Ala Arg Ala Arg Thr Ala His His Asp Arg
1 5 10

<210> 226
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 226
gccaacagcc acgccgccca cggcaccagc 30

<210> 227
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 227
Ala Asn Ser His Ala Ala His Gly Thr Ser
1 5 10

<210> 228
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 228
acccccggcc acggccaccc ccacccccgac 30

<210> 229
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 229
Thr Pro Gly His Gly His Pro His Pro Asp
1 5 10

<210> 230
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 230
cgcgggcggcc gcgcccccca cagcagcgcc 30

<210> 231
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 231
Arg Gly Gly Arg Ala Pro His Ser Ser Ala
1 5 10

<210> 232
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

310
<400> 232
gccggccgcg gcaccagcag caccgcggc 30

<210> 233
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 233
Ala Gly Arg Gly Thr Ser Ser Thr Arg Gly
1 5 10

<210> 234
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 234
ccccgccacg accaccacc cgcccacgac 30

<210> 235
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 235
Pro Arg His Asp His His Pro Ala His Asp
1 5 10

<210> 236
<211> 30
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 236
gaccgcggcc gcaccaaccg caccgacacc 30

<210> 237
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 237
Asp Arg Gly Arg Thr Asn Arg Thr Asp Thr
1 5 10

<210> 238
<211> 45
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 238
cgcgccgacc acggcagccg cgccagccac gacgccagcc gccgc 45

<210> 239
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 239
Arg Ala Asp His Gly Ser Arg Ala Ser His Asp Ala Ser Arg Arg
1 5 10 15

<210> 240
<211> 45
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 240
cacgccggcg ccgacgccga ccgcagcagc aacaccgacg acggc 45

<210> 241
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 241
His Ala Gly Ala Asp Ala Asp Arg Ser Ser Asn Thr Asp Asp Gly
1 5 10 15

<210> 242
<211> 45
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

310
<400> 242
gccagccgca ccgacgccgc ccgcgacgcc accgccagcc gcccc 45

<210> 243
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 243
Ala Ser Arg Thr Asp Ala Ala Arg Asp Ala Thr Ala Ser Arg Pro
1 5 10 15

<210> 244
<211> 45
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 244
accggcaacc gcaccgaccg cgcccccccc gccagcagcc ccgac 45

<210> 245
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 245
Thr Gly Asn Arg Thr Asp Arg Ala Pro Pro Ala Ser Ser Pro Asp
1 5 10 15

<210> 246
<211> 45
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 246
cccaacgccc gcggcgccaa ccgcaccgcc ggcagcaccg ccagc 45

<210> 247
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 247
Pro Asn Gly Arg Gly Ala Asn Arg Thr Ala Gly Ser Thr Ala Ser
1 5 10 15

<210> 248
<211> 45
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 248
cgcgccagca gcgacgccgc ccgccccccc agcagcaacg gcgcc 45

<210> 249
<211> 15
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 249
Arg Ala Ser Ser Asp Ala Ala Arg Pro Pro Ser Ser Asn Gly Ala
1 5 10 15

<210> 250
<211> 60
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 250
agcgccggca ggcacagcgc ccgccacacc gccccccgca gccccgccag 50

cgccgccaac 60

<210> 251
<211> 20
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 251
Ser Ala Gly Ser Asp Ser Ala Arg His Thr Ala Pro Arg Ser Pro
1 5 10 15

Ala Ser Ala Ala Asn
20

<210> 252
<211> 60
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 252
gccccagca ggcgcggcaa cgaccccgac cgcagccgca ggcagcccc 50

cggcaccggc 60

<210> 253
<211> 20
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 253
Ala Pro Ser Ser Ala Gly Asn Asp Pro Asp Arg Ser Arg Ser Asp
1 5 10 15

Ala Arg Gly Thr Gly
20

<210> 254

<211> 60
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 254
gacggcagcc ccaacggcgg ccgcggccac aacgacaacc ccccccggg 50

ccacgcccc 60

<210> 255
<211> 20
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 255
Asp Gly Ser Pro Asn Gly Gly Arg Gly His Asn Asp Asn Pro Pro
1 5 10 15

Arg Gly His Ala Pro
20

<210> 256
<211> 60
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 256
agcgccagcg ccgacagcag ccgcaccgcc gcccgcccc ccgcccccg 50

caccgccagc 60

<210> 257
<211> 20
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 257
Ser Ala Ser Ala Asp Ser Ser Arg Thr Ala Ala Arg Pro Pro Gly
1 5 10 15

Pro Gly Thr Ala Ser
20

<210> 258
<211> 60

<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 258
cgccagcgcgc cccggccgcga cgcgggcccgc gaccgccccg ccggcagcag 50

cggcagccac 60

<210> 259
<211> 20
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 259
Arg Ser Ala Ala Gly Arg Asp Ala Gly Arg Asp Arg Pro Ala Gly
1 5 10 15

Ser Ser Gly Ser His
20

<210> 260
<211> 60
<212> DNA
<213> Artificial sequence

<220>
<223> linker oligonucleotide

<400> 260
agcggcagcc ccgccaacgc ccccgccac cacagccacc acgacgccg 50

cagcggcccc 60

<210> 261
<211> 20
<212> PRT
<213> Artificial sequence

<220>
<223> linker peptide

<400> 261
Ser Gly Ser Pro Ala Asn Ala Pro Gly His His Ser His His Asp
1 5 10 15

Ala Arg Ser Gly Pro
20

<210> 262
<211> 75
<212> DNA

<213> Artificial sequence

<220>

<223> linker oligonucleotide

<400> 262

caagccagcg acgacgccgc ccgcgacggc cgcagcgaca acaaccggg 50

cagcaacggc agcgacagca gcagc 75

<210> 263

<211> 25

<212> PRT

<213> Artificial sequence

<220>

<223> linker peptide

<400> 263

His Ala Ser Asp Asp Ala Ala Arg Asp Gly Arg Ser Asp Asn Asn
1 5 10 15

Arg Gly Ser Asn Gly Ser Asp Ser Ser Ser
20 25

<210> 264

<211> 75

<212> DNA

<213> Artificial sequence

<220>

<223> linker oligonucleotide

<400> 264

agccagccg gcaacgacgc cggccgcgcc cgcaccaacc acagcgacgg 50

ccccacggc cacagcagcc cccgc 75

<210> 265

<211> 25

<212> PRT

<213> Artificial sequence

<220>

<223> linker peptide

<400> 265

Ser His Ala Gly Asn Asp Ala Gly Arg Ala Arg Thr Asn Gly Ser
1 5 10 15

Asp Gly Pro His Gly His Ser Ser Pro Arg
20 25

<210> 266

<211> 57

<212> DNA

<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII oligonucleotide library

<220>
<221> unsure
<222> 1, 4, 7, 10, 13, 16, 19, 22, 25, 28, 31, 34, 37, 40, 43, 46, 49,
52, 55
<223> unknown base

<400> 266
nwnknknwn ytnytnknw tnwnwnwnw nwnknknyn knynwnwnk 50

tnwnwnw 57

<210> 267
<211> 57
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 267
gtttttgttt tttctgttga tggtagataat aattggattt gggctgtcgg 50

tattggtt 57

<210> 268
<211> 19
<212> PRT
<213> Artificial sequence

B10
<220>
<223> M13 variant coat protein VIII fragment

<400> 268
Val Phe Val Phe Ser Val Asp Val Asp Asn Asn Trp Ile Trp Ala
1 5 10 15

Val Gly Ile Val

<210> 269
<211> 57
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 269
catagtcttg ctgttattga tgataatttt tattggggttg gggtttacgg 50

ttatggtt 57

<210> 270
<211> 19

<212> PRT
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 270
His Ser Leu Ala Val Ile Asp Asp Asn Phe Tyr Trp Val Gly Phe
1 5 10 15
Tyr Gly Tyr Val

<210> 271
<211> 57
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 271
cttttttatac ctgtagtggt tcatattggt attcggtttt tgtctctctt 50
tcttggtt 57

<210> 272
<211> 19
<212> PRT
<213> Artificial sequence

810
<220>
<223> M13 variant coat protein VIII fragment

<400> 272
Leu Phe Tyr Pro Val Ser Val His Ile Val Ile Arg Phe Leu Ser
1 5 10 15
Leu Phe Leu Val

<210> 273
<211> 57
<212> DNA
<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 273
cttagtggtg ttgttcgtga tcttatttat aatgtgggta tgtttcacgt 50
tgттаат 57

<210> 274
<211> 19
<212> PRT

<213> Artificial sequence

<220>

<223> M13 variant coat protein VIII fragment

<400> 274

Leu	Ser	Val	Val	Val	Arg	Asp	Leu	Ile	Tyr	Asn	Val	Val	Met	Phe
1				5				10					15	

His Val Val Asn

<210> 275

<211> 57

<212> DNA

<213> Artificial sequence

<220>

<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 275

cttggttttt ctactcgtgt tcttggtgat gattggctta tggttaacag 50

ttttgat 57

<210> 276

<211> 19

<212> PRT

<213> Artificial sequence

<220>

<223> M13 variant coat protein VIII fragment

<400> 276

Leu	Gly	Phe	Ser	Thr	Arg	Val	Leu	Val	Asp	Asp	Trp	Leu	Met	Val
1				5				10					15	

Asn Ser Phe Asp

<210> 277

<211> 57

<212> DNA

<213> Artificial sequence

<220>

<223> M13 variant coat protein VIII fragment oligonucleotide

<400> 277

tattttcttg ctttttagtat tattgatctt tttaggcttt ggctttactt 50

tgттаат 57

<210> 278

<211> 19

<212> PRT

<213> Artificial sequence

<220>
<223> M13 variant coat protein VIII fragment

<400> 278
Tyr Phe Leu Ala Phe Ser Ile Ile Asp Leu Phe Arg Leu Trp Leu
1 5 10 15

Tyr Phe Val Asn

<210> 279
<211> 6
<212> PRT
<213> Artificial sequence

<220>
<223> pentaHis flag

<400> 279
His His His His His Ala
1 5

<210> 280
<211> 7
<212> PRT
<213> Artificial sequence

<220>
<223> hexaHis flag

B10
<400> 280
His His His His His His Ala
1 5

<210> 281
<211> 9
<212> PRT
<213> Artificial sequence

<220>
<223> nona peptide flag

<400> 281
Ala Ala His His His His His Ala
1 5

<210> 282
<211> 9
<212> PRT
<213> Artificial sequence

<220>
<223> M13 phage fragment

<400> 282
Lys Leu Phe Lys Lys Phe Thr Ser Lys
1 5

<210> 283
<211> 9
<212> PRT
<213> Artificial sequence

<220>
<223> retrotranslation of SEQ ID NO.282

<400> 283
Lys Ser Thr Phe Lys Lys Phe Leu Lys
1 5

<210> 284
<211> 20
<212> PRT
<213> Artificial sequence

<220>
<223> retrotranslation of SEQ ID NO.285

<400> 284
Glu Thr Ala Ser Ala Gln Leu Ser Asn Ser Ala Ala Lys Ala Pro
1 5 10 15

Asp Asp Gly Glu Ala
20

<210> 285
<211> 20
<212> PRT
<213> Artificial sequence

<220>
<223> M13 phage fragment

<400> 285
Ala Glu Gly Asp Asp Pro Ala Lys Ala Ala Phe Asn Ser Leu Gln
1 5 10 15

Ala Ser Ala Thr Glu
20

<210> 286
<211> 4
<212> PRT
<213> Artificial sequence

<220>
<223> tetra peptide linker

<400> 286
Ala Ala Asp Ala
1

<210> 287
<211> 6
<212> PRT

<213> Artificial sequence

<220>

<223> hexaHis

<400> 287

His His His His His His

1

5

BIO
ADNA